

the kestrel does by day. The kestrel can see its prey when two hundred or three hundred feet below it, and though we always feel pity for the creatures it destroys, it is comforting to know that they can feel no pain. For ten months out of the twelve the kestrel is busy, and *one* will destroy, on an average, 10,000 mice annually! We were then told about the *Thrush's* proclivity for snails, and about the lecturer having noted in one garden several large stones each surrounded by broken snail shells. Each thrush will have its own particular stone to which it carries all its snails, there to break the shell, first on one side and then on the other, until it can conveniently extract the snail. Of all birds the *Robin* is the greediest, and a robin weighing only one ounce will eat comfortably two and a half ounces of food in a day, or fourteen feet of earthworms! Here the lecturer worked out an amusing little sum, by which he proved that had a man weighing fourteen stones an appetite proportionate to a robin's he would require two thousand five hundred and twenty sausages a day! Surely, knowing this, we can no longer tell our delicate friend that she has "only the appetite of a bird." Other interesting facts were given us about the *Cuckoo* (which one small boy had defined as "a bird that does not lay its own eggs!") and of several kinds of beetles, the blackboard illustrations all through the lecture being admirable.

Among the exhibits arranged round the room, some of the most noticeable were the excellent Brushwork designs done by children of twelve to fourteen years in the London School-Board. Knowing little about designs myself, I could not attempt to criticise, but the colouring and correctness of form, as well as the originality of the work, made one long to be able to do it as well oneself. I noticed among the collections a very good one of different kinds of wood, but what struck me most was the admirable Brushwork studies of twigs sent in by Gladys Clark-Kennedy (13). The work was not only vigorous in colour and touch, but the specimens were well-chosen and arranged, and the distinctive forms had been very carefully depicted, and some of the paintings showed the different stages of the buds. The specimens chosen were: Ash, Mountain Ash or Rowan, Acacia, Wych Elm, Lime, Balsam Poplar, Lombardy Poplar, Oriental Plane, Oak, Aspen Poplar, Walnut, Sycamore, Horse Chestnut, and Beech. There was a collection of (deserted) birds' nests, and

various others of dried and mounted flowers. Mrs. Anson had sent in a set of most beautifully painted wild-flowers (done on white, and mounted on grey paper), and she told me that these were taken from some four hundred others which she has done. I did not note much effort in the way of Geology, but there was one very nice collection sent by E. and C. Brooks, of Crawshaw Hall, Rawtenstall. There were contingents of Nature Diaries, Sloyd models, and other work from Ambleside, but I fear I have already trespassed too much on the limited space of our Magazine. I will only add that the whole was most refreshing and inspiring, and though it means perhaps real inconveniences to many of us to get up to town at the time of year when the Conference is held, I should like to say that, for us who live so much in the country, it is an annual opportunity for "rubbing up" and gaining fresh inspiration and ideas, which we should do well to use whenever possible, making real effort to be present.

C. F. BARNETT.

#### NATURE NOTES.

A FEW students have sent flower lists and nature notes for comparison. Next time I shall hope to get more. I do not see why the competition for the record flower list should not be as keen as in Ambleside days. Miss Strachan sends a capital list from Norfolk. She has Comfrey and Ivy-leaved Toadflax among Ambleside friends which do not seem to favour this county (Surrey). She has also among her flowers both alternate and opposite-leaved Golden Saxifrage. Miss Tetley sends an account of an evidently fascinating "corner of Scotland," which I am sorry not to be able to publish. In and near the Nith valley she has found Globe Flowers, Sundew, Butterwort, and the Rock Rose among more widely distributed plants. She describes a country of Bracken and Heather, bubbling rocky burns, deep valleys, and tiny villages each with its kirk, its "curling pond," and its "manse"—all complete in its primitive simplicity. Surrey seems to patronise Broom and Petty Whin, which is like a small plant

of Broom. Yellow Archangel, a handsome yellow dead-nettle protecting itself by growing among the Stinging Nettle, whose leaves its own resemble, is so common as to be quite a feature of Surrey. In what other counties has it been found?

I suppose most of our pupils are ardent collectors in one direction or another. For collections of flowers or grasses (now is the time for the latter especially) presses may be bought, but they can easily be made by using two pieces of thick cardboard or Sloyd cutting-boards. Have the flowers or grasses pressed in plenty of paper, and strap the boards tightly to squeeze them together. Flowers may be mounted to illustrate the natural orders taken in botany lessons. The calyx, corolla, etc., may be mounted separately, and can be opened out to lie quite flat without pressing. They are mounted with photo-mounter or good paste, and the colour and brightness lasts much better than with pressed flowers.

Leaves may be mounted without pressing in the same way. Twigs collected in early spring may be mounted side by side with the leaves of the same trees when fully out. The leaves may be pasted on, while the twigs, if the collection is on cardboard, can be fixed by passing a piece of elastic over them and through holes bored at each side and knotting at the back. The "initial idea" of such a collection would be that of the correspondence between the shapes and sizes of the leaves, and of the buds which contained them. Oak buds are very small, much smaller in proportion to their leaves than Beech buds, for instance. The Oak leaf needs to be tightly packed for warmth. The baby Beech leaves are sufficiently protected in their mantle of silky and waterproof scales. The wavy edge of the Oak leaf is caused by this tight packing into the bud. In warmer climates Oak buds are larger in proportion, and the edges of the leaves lose their characteristic outline. The Horse Chestnut bud is very large, for the already large leaf is well protected by downy wrappings. The Ash leaves are very tightly packed, more tightly than would be possible were they not compound leaves divided into about eleven little leaflets.

The shape of the seed leaves does not, of course, depend on the size of the leaf buds, as they unfold not from buds but from the seed. A collection of seedling trees in various stages would show how each seed leaf is adapted to its own seed. The long thin Sycamore cotyledons are folded into the

little seed as a conjuror might fold yards of ribbon into an Easter egg. The fan-shaped Beech cotyledons fold into three, and exactly fit the triangular beech-nut. The first foliage leaves do not come exactly above the seed leaves, but turn so that the sunlight may reach them. Baby Sycamore, Beech, and Oak trees are plentiful, and are still at a most interesting stage. In collecting flowers other bases of arrangement may be employed, besides placing those together which belong to the same natural order. There are certain characteristics in common between flowers of the same habitat and flowers fertilized by the same insects, which do not always correspond with the likenesses by which they are placed in the same family. Bees choose red or blue flowers, and those with irregular corollas, a convenient platform to rest upon, and often bright stripes or markings which serve as sign-posts saying, "This way to the honey." Wasps like brown flowers, e.g., Figwort, which also has an irregular corolla. Hovering insects, as butterflies and moths, do not require a platform, and visit regular flowers with often a tubular corolla fitted to their long slender trunks.

Galls are always interesting to children; it is so exciting to "wonder what's inside" and sometimes to cut open a duplicate specimen to see. The true Gall Flies are members of the Ant and Bee family—the *Hymenoptera*—but some Galls, e.g., those on the willow, are produced by a species of Saw Fly, which reminds me to say, keep a look out just now for Saw Fly larva. They are green and resemble ordinary caterpillars, but may be distinguished by their having ten or twelve pairs of false legs—true caterpillars having usually only four pairs besides their six true legs.

When the roots of Oaks are exposed to view the Galls may be found on them which are produced by *Cynips Aptera*, a wingless Gall Fly. The insect which comes out of the Currant Galls found on the Oak flowers produces a Spangle Gall on the Oak leaf—the creature which emerges from the Spangle Gall produces again a Currant Gall, so that the generations alternate, each creature "taking after" its grandparents, but not its parents. The Galls on roses called "Robin's Pincushion" contain a numerous colony of Gall Fly larva.

Those of us who live in the neighbourhood of pools and ponds may make exciting raids on them armed with a net and

a few galley pots. On our return we can stock our aquarium, isolating such greedy and indiscriminate murderers as the Dragon Fly larva, and the larva of the large carnivorous Water Beetle, *Dysticus Marginalis*. These are, nevertheless, very interesting, and may be kept separately and fed with Tadpoles or May-fly larva. When the Dragon Fly larva is ready to change a piece of reed or twig leading out of the water must be provided for them to crawl up. The Beetle larva must, at this time, be given a chance of burying himself in earth or he will die, as he wants to crawl out and bury himself in the banks to undergo the pupa stage. You are sure to get several kinds of eggs which you should also separate, in order to see what they will turn out. If you have a microscope look at your creatures through the one-inch lens. You may put them under alive in a watch glass. Many of them are entirely or partially transparent. You can easily see the circulation of the blood through the gills of a Tadpole; in this way May-fly larva are also good subjects. The Gnat larva are not very transparent, but their spiracles may be clearly seen. In quite shallow water you may find a "rat-tailed maggot." This is the larva of a species of fly. It crawls slowly along the mud by means of tiny feet, and sticks up a tail-like appendage to the surface to breathe. If you put it into deep water it will drown, but if you very gradually increase the depth of water the tail also will increase in length up to a certain extent.

If you want to keep caterpillars of moths and butterflies, have a box with a false bottom, or two cardboard boxes fitted one into the other. Drill holes in the false bottom, through which stick the leaves on which your caterpillars feed into a pan of water, which can be put in the lower part between the two bottoms. In this way the leaves can be kept fresh and only occasionally need renewing.

#### QUERIES.

Can any one tell us of a good catalogue or book giving popular names for Fungi, Mosses and Lichens? Children often come with treasure-trove anxious to know its name, but not wanting to be told that they have got *Cladonia Pixidata*, *Agaricus Campestris*, *Cladonia Coralloides*, etc. When possible I translate the Latin names and tell them they have the Coral-cup Lichen, etc., but all Latin names do not lend

themselves to translation, and is there any reason why we should not agree upon some easy names for such mosses, fungi, lichens, etc., as are not sufficiently well known to have them already?

Can any student of pond-life recognise the following transparent flat-bodied creatures, swimming actively (but not on their backs), having a pair of long paddles like those of a Water-boatman, but no wing cases? Through a microscope they are seen to have jaws like those of a crab, and the segments of their oval bodies show distinctly.

Five or six eggs laid singly on a bit of water-weed were kept separately. After three weeks there emerged from each, one tiny orange-coloured creature, with backs spotted with black. They have gills and a tail much like a Frog Tadpole, but are only about quarter of an inch long. (These are now believed to be Newt Tadpoles.)

Are there many moths which sleep in the daytime with open wings? One was thus found on a leaf, and with its antennæ folded back across its body. It was so fast asleep that it was easily carried away, with the leaf, to a place of safety before it awoke.

Can anyone describe a Nightingale's egg?

Miss Sophie Smyth sends the following interesting description of the bog flowers, for which you should now be on the watch, from Hampshire.

Of all the many places where flowers are to be found, I think there is none more fascinating and delightful than a trembling bog.

One of the most common plants we meet with in such a situation is the common round-leaved Sundew (*Drosera Rotundifolia*), but its flower requires some patient searching, and is only seen open in very bright sunshine. The leaves spread out over the mud, while those of the long-leaved kind (*Drosera Intermedia*) rise up perpendicular.

Here and there are to be seen patches of yellowish glaucous leaves out of which rise slender stems bearing single violet-coloured flowers. This is the common Butterwort (*Pinguicula Vulgaris*).

The Marsh Valerian (*Valeriana Dioica*) grows here too. It only looks like a very stunted specimen of its larger cousin, the Great Valerian. Both are pink and both have very cut

leaves, but the Marsh Valerian is less common and does not grow much above a few inches in height, while the Great Valerian attains several feet.

Here and there we see some round woolly leaves with pale yellow blossoms growing right in the water; this is the Marsh St. John's Wort (*Hypericum Elodes*), the only one of its kind, I think, which grows in such wet situations.

We wade on through the mud, though our feet are soaking wet; however, they must become still wetter, as we see something interesting sticking up out of the water. Desperate efforts are made to reach it, and it is worth the trouble, as it is the flower of the beautiful Buck-Bean (*Menyanthes Trifoliata*) which, however, is past its best. Its season for flowering is short, and the lowest flowers generally die off before the topmost ones are out.

You cannot mistake this plant, as the leaf is like a large clover leaf, divided into three parts, glaucous and shining.

Very interesting little plants are the Carexes, very many of whose homes are marsh bogs. A common one is the Tufted Carex, which you may recognise by the dark-brown or almost black glumes.

Then there is the Marsh Carex, whose female spikelets are quite black while in bud, those of the male being of a reddish sandy colour.

The Whitish Carex frequents the most marshy parts, but is not so common as some of its kind. A large one is the Bottle Carex, whose female spikelets are something in the shape of a bottle, hence its name.

Then there is another little flower which lends enchantment to the scene, the Bog Pimpernel, with its beautiful little pink flowers and trailing stems; here beside it we see the star-like blossoms of the Bog Asphodel, which has sword-shaped leaves in miniature.

Still we proceed; and what is that mass of white in the distance—surely it looks like the Water Ranunculus? We carefully make our way, though it is by no means an easy task, jumping from one precarious foothold to another, yet now we are close enough to see it is no flower but the silky fruit of the Cotton Grass (*Eriophorum Augustifolium*) waving in the breeze. (I have seen quantities of this growing in dense masses.)

The plover shrieks over our heads, uttering most weird cries, and sometimes comes within a few yards of us, trying to assure us that he is a dangerous enemy.

But we must look even more closely and perhaps we shall find a little flower known as the Lesser Skull-cap (*Scutellaria Minor*). This is something like the Greater Skull-cap, only pinkish in colour and smaller in size. When we once find it, we shall probably see it in great abundance, but it is not common.

There is yet another bog plant, which is a great favourite of mine, the Marsh Potentilla, with its handsome strawberry-like leaves and dull purplish flowers.

Other plants we may meet with (which I have not time to mention at any length) are,—the Red Rattle (*Pedicularis Palustris*), very like the Lousewort; the Grass of Parnassus, queen of bog flowers, but not found in every bog; Bog Myrtle, which in midsummer would only betray its existence by its shining olive-green leaves; the Dwarf Willow, which creeps along the ground and is not a tree at all. This would also have ceased flowering although we might be fortunate enough to find one blossom "left blooming alone."

S. SMYTH.

#### AVERAGE ATTAINMENTS.

WHILE considering a definite standard of attainments for a child of ten years of age it must be borne in mind that such a standard practically means nothing from an educational point of view, in the highest sense of the word. It is merely a useful guide to teachers in regard to certain school subjects and a help in defining work of which the range is so wide, that it is easily possible to go over the same ground several times while some paths are left untrodden. By ten years of age almost all the foundation of future work should be laid. By that time the child should hold in his hands, and should have a firm grasp upon the beginnings of those threads which are to lead him through straight and narrow ways to the gates of knowledge. It will be long before he finds the correlation of these threads, for that must be the result of his